EFFECTIVENESS OF INTRAVENOUS LIDOCAIN IN PAIN CONTROL AND POSTOPERATIVE RECOVERY FROM ABDOMINAL SURGERY

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Introduction

Today, abdominal surgeries are very common in most species. Concern for the well-being of patients leads to increasingly seeking more effective analgesic protocols, especially in those major surgeries that tend to be more painful.

Background

- Postoperative ileus:
  - Inability to recover gastrointestinal motility after abdominal surgery.
  - Most common side effect in major abdominal surgeries.
  - Multifactorial etiology. Related with opioids.
- Pain and analgesia:
  - Abdominal surgeries are very painful procedure.
  - The mainstay of postoperative analgesia remains opioids, which have many side effects.
  - It tends to be a multimodal pain management.

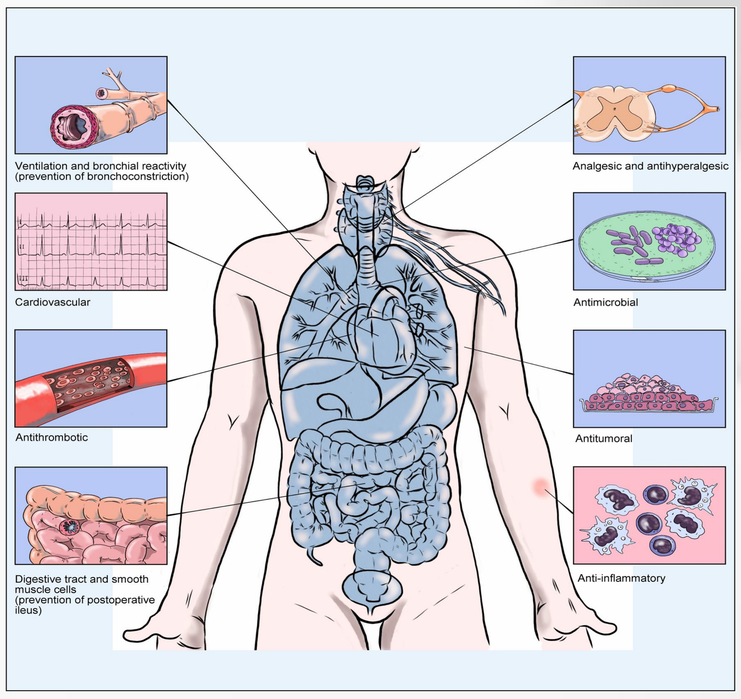

Figure 1. Pharmacological properties of lidocaine (Beaussier 2018).

Objective

- Review the mechanism of action by which lidocaine may be effective in pain control and recovery from abdominal surgery.
- To evaluate bibliographically the effectiveness of lidocaine in postoperative abdominal surgery in humans.
- To evaluate bibliographically the effectiveness of lidocaine in postoperative abdominal surgery in veterinary medicine.
- Determine the protocols in terms of dose and format in which it can be effective.

Materials and methods

Search using the search engines Pubmed, Google Scholar and Mendeley.
Keywords: lidocaine, analgesia, postoperative, continuous infusion, abdominal surgery, horse, dog.
Articles with repeated concepts and data or that did not meet the search requirements were discarded.

Mechanism of lidocaine

- Lidocaine:
  - Amide group anesthetic.
  - Interesting for its effects as a treatment for intestinal ileus because it has anti-inflammatory effects such as suppression of histamine release form mast cells, decrease in albumin extravasation and microvascular permeability, inhibition of sequestration, migration and activation of polymorphonuclear cells, etc.
  - The analgesic mechanisme effect is difficult to determine, we have two ways:
    - Selectivness suppression of pain transmission in the spinal cord.
    - Tonic neural discharge from active peripheral nerve fibers (Aδ and C, specially sensitive to lidocaine).

Results of effectiveness

Humans

Table 1. Summary of humans results.

Primary results	
Postoperative pain (rest)	Effectiveness in the early period (1-4 hours to 24 hours).
Gastrointestinal recovery	4.8% in lidocaine vs. 13.9% control of postoperative ileus.
Secondary results	
Length of hospitalization	There are studies that report a shortening and others do not.
Surgical complications	2’16% in lidocaine vs 1’44% control.
Postoperative nausea and vomiting	Nausea of 20.1% lidocaine vs 28.4% control. Vomiting 2.6% lidocaine vs 5.8% control. In the hours leading up to surgery.
Opioid requirements	Reduced throughout the recovery process.
Plasma levels of cytokines	Decreased cytokines in lidocaine groups.
Side effects of lidocaine	They are not reported or are mild symptoms.

Type of surgery benefited:

Laparoscopic surgery> Open abdominal surgery> other surgeries

Animals

Horses:

Table 2. Summary of horses results.

Results	
Postoperative reflux	65% lidocaine vs. 27% control at 30h ceased to have reflux. The amount also decreased by approximately 0.5%.
Time in defecation, borborygmus and feeding	1st defecation 6 hours before the treatments vs control. Food also before in treaties.
Postoperative complications	There are no differences in gastrointestinal symptoms. Laminitis and incision discharge more prevalence in the control group.
Length of hospitalization	A difference of about 5 days less in the treated than in the untreated.
Ultrasound examination	There were differences in terms of inflammation and free fluid favoring the treated versus the untreated.

Dogs:

- 88.2% needed rescue analgesia in the control group versus 22.2% in the treated group.
- The pain in the control group increased after 1 hour, in that of lidocaine after 3 hours.
- When it becomes perioperative there is a drop in anesthetics in surgery. 45% in the case of halothane.

Discusion

- In humans, the results are generally positive. There is an improvement in:
  - Reduction of analgesic requirements.
  - Acceleration of intestinal recovery.
  - Shortening of hospital stay.
  - It does not appear to have serious side effects, although there are few studies that value it.
- In animals with respect to horses:
  - Overall improvement of the parameters studied in the treated and untreated groups.
  - But there are many contradictions as to the results of each study, some have unreliable data for little sample.
- In animals with regard to dogs:
  - The results were positive in some parameters but not in the same way as in equids.
  - Regarding some other treatments, the results do not make it clear that lidocaine is a better option due to the effectiveness of NSAIDs, for example.

Conclusion

- Lidocaine in humans is well studied but the mechanism by which it is useful in abdominal surgeries is not well known.
- It is widely used in veterinary medicine but the unknowns are even greater as there are few well-thought-out studies.
  - Many inconsistencies in the results.
  - Few samples.
- It is necessary to continue researching with this line and to give a justified use in these situations to lidocaine.